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FOREST STATISTICS FOR THE ARKANSAS OZARKS

A PROGRESS REPORT OF THE SOUTHERN FOREST SURVEY

William A. Duerr, In Charge

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THE SOUTHERN FOREST SURVEY

The Southern Forest Survey, an activity of the Southern Forest Experiment Station, covers the seven States of the Station's territory—Alabama, Arkansas, Louisiana, Mississippi, Oklahoma, Tennessee, and Texas. This Survey is a part of the nation-wide Forest Survey authorized by the McSweeney-McNary Forest Research Act of 1928. Its fivefold purpose is (1) to take inventory of the supply of standing timber and other forest products; (2) to ascertain the rate at which this supply is being increased through growth; (3) to determine the rate at which this supply is being diminished through industrial and local use, and by fire, insects, disease, and other agencies; (4) to estimate the present requirements and the probable future trend in the requirements for timber and other forest products; and (5) to correlate these findings with existing and anticipated economic conditions, in order that policies may be formulated for the effective use of lands suitable for forest production.

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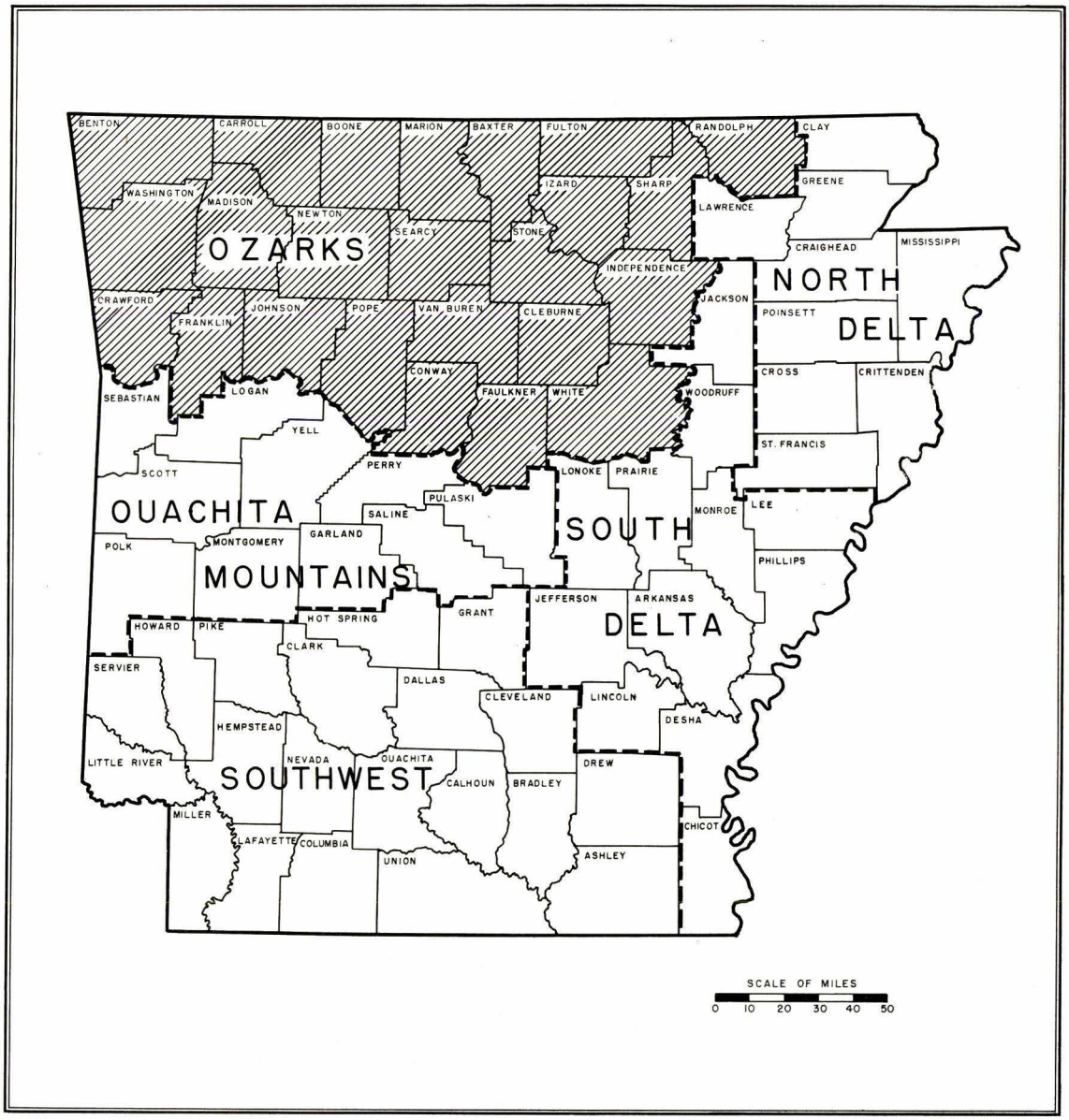

Figure 1.--The Ozarks in relation to the other Forest Survey regions in Arkansas.

FOREST STATISTICS FOR THE ARKANSAS OZARKS

This publication summarizes the data on forest area, timber volume, and timber growth collected by the Southern Forest Survey in the Ozark region of Arkansas, the 24 counties in the mountainous northwest portion of the State (figure 1). The Survey, made between April 1947 and April 1948, was the first of its kind in this section of the State. The remainder of Arkansas, covered by the Southern Forest Survey in 1935 and 1936, will be resurveyed in 1949.

Highlights

The current Survey found that nearly 60 percent of the land--over 6 million acres--is forested. The even distribution of the forest is shown by the fact that only 5 counties of the 24 are less than half forested.

Private owners hold 82 percent of the forest land. Fifteen percent is in the Ozark National Forest, and 3 percent is held by other public agencies.

The principal forest types (figure 2) are upland hardwood and upland hardwood-pine, which together cover 79 percent of the total forest land. The shortleaf pine type, which is scattered throughout the Ozarks, includes 12 percent of the forest. Bottomland hardwood, occurring chiefly along the eastern and southern edges of the Ozarks, includes 5 percent. The cedar type, localized in the northern portion of the region, includes 4 percent of the forest.

The timber is small. More than half the forest acreage is in cordwood stands and an additional 31 percent is below cordwood size. Only 17 percent is in saw-timber stands.

The density of growing stock is low. One-third of the forest is well stocked, but close to a half is partially stocked and the rest is poorly stocked or nonstocked. The volume of cull trees is nearly three-fourths as great as the volume of growing stock.

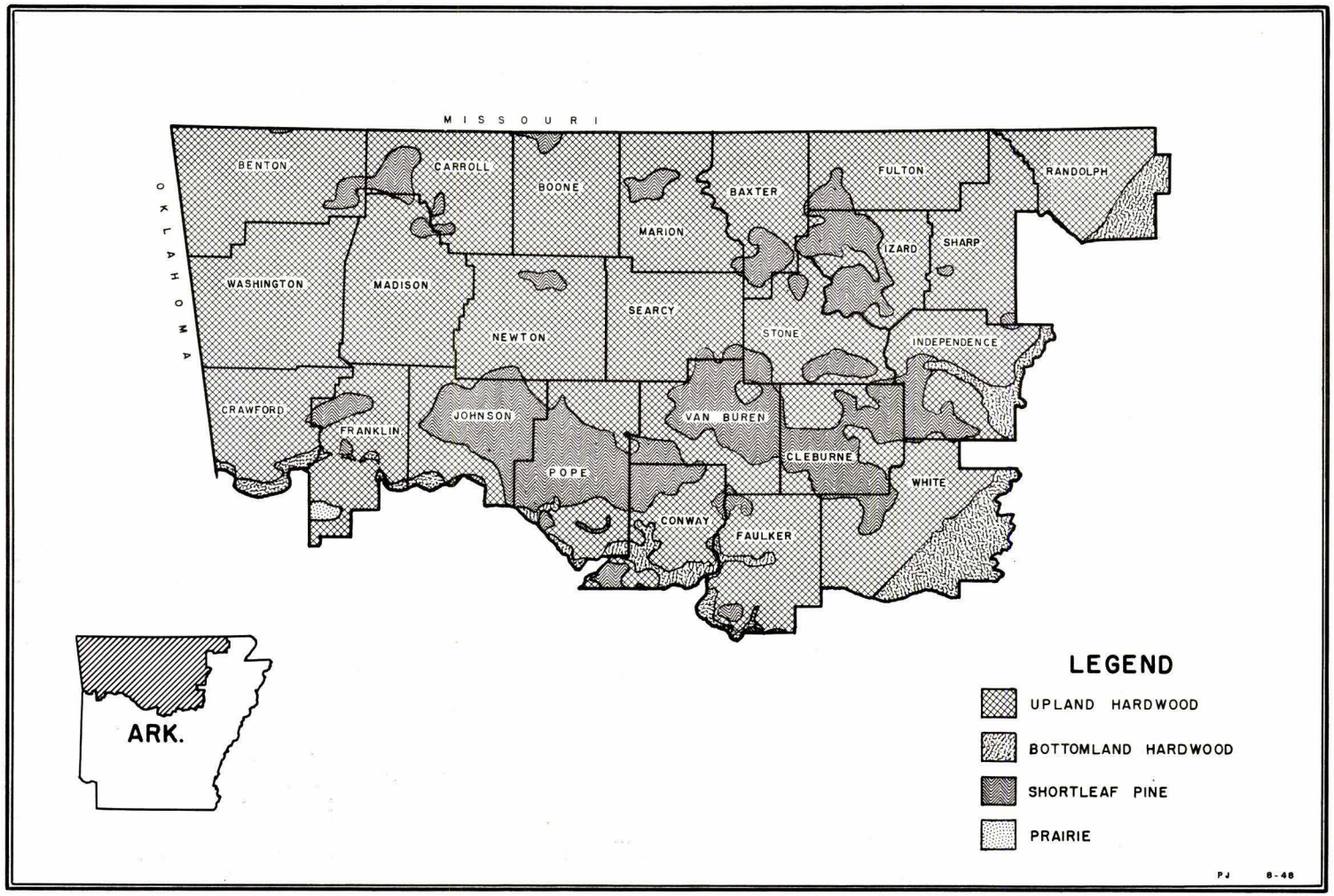

Figure 2.--Generalized forest types in the Arkansas Ozarks. The cedar and upland hardwood-pine types are not concentrated enough to be shown.

Growing-stock volume is low, and half of it is in cordwood-size trees. The total growing stock is 1,667 million cubic feet, or an average of 273 cubic feet per acre. Volume per acre is heavier in the shortleaf pine and bottomland hardwood types than it is in the upland hardwood and upland hardwood-pine types.

Hardwoods comprise 83 percent of the total growing stock. Black oak and other species in the red oak group are 30 percent of the total; white oaks, 23 percent; and other hardwoods--mainly hickory and gums--30 percent. The volume of softwoods is relatively small: shortleaf pine is 16 percent of the total; redcedar and cypress, only 1 percent.

Sawlog growing stock is low: 5,434 million board feet, or 889 board feet per acre. Some 47 percent of the sawlog volume occurs in trees scattered through cordwood and smaller stands, which emphasizes the fact that much of the volume cannot be harvested economically because of its sparse distribution.

Sawlog growing stock, like total growing stock, occurs principally in hardwood species. Red oaks are 35 percent, white oaks are 22 percent, and gums, hickory, and other hardwoods are 29 percent. The remaining 14 percent is softwood.

Not only does sawlog volume occur mainly in small trees and often in insufficient concentration for commercial cutting, but quality is outstandingly poor. Grade 2 and better logs occur on only 15 percent of the saw-timber area. Only one-fourth of the hardwood sawlog volume is in grade 1 or grade 2 logs; three-fourths is low-grade. In softwoods, one-half the volume is in low-grade trees.

Current growth of the total growing stock is 83.7 million cubic feet, of which 60 percent is being added in trees of cordwood size. The average growth per acre of forest land is 14 cubic feet per year, including pine as well as hardwood areas. Sawlog growth amounts to 302.5 million board feet, or an average of 49 board feet per acre per year.

Accuracy of the Data

The Ozark forest data were obtained from a sampling of aerial photographs and from on-the-ground measurements on pairs of quarter-acre sample plots located every 3 miles on lines 3 miles apart throughout the region. Statistical analysis of the data indicates a sampling error of 0.5 percent for the estimate of total forest area, and of 3.4 percent for total board-foot volume. As these totals are broken down by county, forest type, species, and other subdivisions, the possibility of error increases and is greatest for the smallest items. The maximum sampling error to which the estimates are liable, on a probability of two chances out of three, is approximately as follows:

Maximum sampling error in forest area		Maximum sampling error in cubic-foot volume		Maximum sampling error in board-foot volume	
Thousand acres	Percent error	Million cu. ft.	Percent error	Million bd. ft.	Percent error
6,000	0.5	1,600	2.6	5,000	3.4
3,000	.7	1,000	3.4	3,000	4.4
1,000	1.2	300	6.2	1,000	7.7
500	1.8	100	10.6	500	10.9
50	5.6	30	19.4	50	34.4

The estimates of sampling error do not include errors in volume tables, cull allowances, or other such measurements. Methods of estimating errors of this type have not been developed.

Definitions of terms used in this report will be found on pages 20 to 23.

Table 1.--Land area by type of use, 1948

Land use	Area	Proportion of total area
	Thousand acres	Percent
Forest:		
Commercial	6,113.7	57.4
Noncommercial	20.8	.2
Total forest	6,134.5	57.6
Farm nonforest:[1]		
Cropland in use	1,368.0	12.8
Idle or fallow	285.4	2.7
Pasture	1,926.4	18.0
Other farm	273.9	2.6
Total farm nonforest	3,853.7	36.1
Other nonforest land	672.3	6.3
All land	10,660.5	100.0

1/ Based on 1945 Census of Agriculture.

Table 2.--Forest land by class of ownership, 1948

Class of ownership	Commercial forest		Noncommercial forest	
	Thousand acres	Percent	Thousand acres	Percent
Private:				
Farm[1]	2,372.7	38.8	1.3	6.2
Other	2,641.5	43.2	1.4	6.8
Total private	5,014.2	82.0	2.7	13.0
Public:				
National forest	893.2	14.7	6.0	28.8
Public domain	118.8	1.9		
Other federal	54.1	.9		
State	2.5	(2/)	12.1	58.2
County	30.9	.5		
Total public	1,099.5	18.0	18.1	87.0
All ownership	6,113.7	100.0	20.8	100.0

1/ Based on 1945 Census of Agriculture.
2/ Negligible.

Table 3.--Land area and commercial forest by county, 1948

County	All land	Commercial forest	
	Thousand acres	Thousand acres	Percent
Baxter	365.4	256.8	70
Benton	567.0	254.6	45
Boone	385.3	206.6	54
Carroll	405.8	236.6	58
Cleburne	380.8	230.3	60
Conway	358.4	147.1	41
Crawford	382.7	193.7	51
Faulkner	419.8	165.7	39
Franklin	393.6	178.2	45
Fulton	391.0	239.6	61
Independence	483.2	259.4	54
Izard	367.4	200.6	55
Johnson	432.6	234.7	54
Madison	532.5	354.9	67
Marion	401.9	273.1	68
Newton	526.1	400.8	76
Pope	522.2	306.7	59
Randolph	407.7	208.5	51
Searcy	425.0	294.6	69
Sharp	381.4	258.1	68
Stone	390.4	291.5	75
Van Buren	457.0	300.9	66
Washington	616.4	308.4	50
White	666.9	312.3	47
All counties	10,660.5	6,113.7	57

Table 4.--Commercial forest land by stand-size class and forest type, 1948

Forest type	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Restocking and denuded
			Thousand acres			
Softwood types:						
Shortleaf pine	740.7	30.6	148.7	476.8	53.4	31.2
Cedar	250.3	...	...	63.8	124.9	61.6
Total	991.0	30.6	148.7	540.6	178.3	92.8
Hardwood types:						
Bottomland hardwood	321.6	56.2	76.7	133.2	34.6	20.9
Upland hardwood	4,094.8	202.5	417.5	2,100.7	1,020.3	353.8
Upland hardwood-pine	706.3	38.4	55.5	414.6	159.9	37.9
Total	5,122.7	297.1	549.7	2,648.5	1,214.8	412.6
All types	6,113.7	327.7	698.4	3,189.1	1,393.1	505.4

Table 5.--Commercial forest land by degree of tree stocking and forest type, 1948

Forest type	All stocking	Well stocked	Partially stocked	Poorly stocked	Non-stocked
			Thousand acres		
Softwood types:					
Shortleaf pine	740.7	284.0	339.7	111.7	5.3
Cedar	250.3	41.7	138.9	59.2	10.5
Total	991.0	325.7	478.6	170.9	15.8
Hardwood types:					
Bottomland hardwood	321.6	120.4	134.9	57.5	8.8
Upland hardwood	4,094.8	1,453.5	1,830.9	747.4	63.0
Upland hardwood-pine	706.3	297.2	306.2	95.1	7.8
Total	5,122.7	1,871.1	2,272.0	900.0	79.6
All types	6,113.7	2,196.8	2,750.6	1,070.9	95.4

Table 6.--Commercial forest land by degree of tree stocking and stand-size class, 1948

Stand size	All stocking	Well stocked	Partially stocked	Poorly stocked	Non-stocked
			Thousand acres		
Large saw timber	327.7	172.7	135.4	19.6	...
Small saw timber	698.4	366.0	301.0	31.4	...
Cordwood	3,189.1	1,245.4	1,333.8	609.9	...
Seedling and sapling	1,393.1	412.7	980.4	(1/)	...
Restocking and denuded	505.4	...	...	410.0	95.4
All sizes	6,113.7	2,196.8	2,750.6	1,070.9	95.4

1/ Stands of seedling and sapling size less than 40 percent stocked are classed as restocking.

Table 7.--Area of saw-timber stands by stand-quality class and forest type, 1948

Forest type	All qualities	Fair or better	Poor
	- - - Thousand acres - - -		
Softwood types:			
Shortleaf pine	740.7	164.9	575.8
Cedar	250.3	5.7	244.6
Total	991.0	170.6	820.4
Hardwood types:			
Bottomland hardwood	321.6	80.0	241.6
Upland hardwood	4,094.8	558.5	3,536.3
Upland hardwood-pine	706.3	84.8	621.5
Total	5,122.7	723.3	4,399.4
All types	6,113.7	893.9	5,219.8

Table 8.--Growing-stock[1] basal area per acre, by forest-type group, stand-size group, and tree diameter class, 1948

Tree diameter class	All types and stand sizes	Softwood types			Hardwood types		
		Saw-timber stands	Cordwood stands	Other stands	Saw-timber stands	Cordwood stands	Other stands
	Square feet						
2	5.6	3.7	6.0	3.5	5.6	5.1	6.6
4	5.9	6.0	10.1	4.6	4.4	6.2	4.8
6	4.8	6.1	10.5	1.7	3.7	5.6	2.2
8	4.4	8.8	8.4	1.7	4.1	5.6	1.4
10	4.1	10.0	4.1	1.1	5.8	5.0	1.3
12	3.4	8.3	2.6	.6	7.4	3.6	1.2
14	2.8	6.8	1.6	.6	7.5	2.6	1.1
16	1.9	5.4	.8	.4	5.7	1.6	.6
18	1.4	1.4	.4	.3	4.9	1.1	.6
20	.7	1.0	.1	.1	2.9	.5	.2
22	.5	.3	.1	.1	2.1	.4	.2
24	.3	...	...	...	1.4	.2	.1
26	.1	...	...	...	.7	.1	...
28	.1	.2	...	...	.7	(2/)	...
30	(2/)	...	...	...	.2	(2/)	...
32	(2/)	...	...	...	.1	...	...
34	(2/)	...	...	...	.1	...	...
40	(2/)	...	...	...	.1	...	...
All diameters	36.0	58.0	44.7	14.7	57.4	37.6	20.3

1/ Including sound, well-formed, 2- and 4-inch trees.
2/ Negligible.

Table 9.--Distribution of total growing stock by species within each forest type, 1948

Species	All types	Shortleaf pine	Cedar	Bottomland hardwood	Upland hardwood	Upland hardwood-pine
			Percent			
Shortleaf pine	16.0	76.1	3.4	...	...	15.6
Other softwood 1/	1.2	.1	34.2	3.8	0.4	1.2
Total softwood	17.2	76.2	37.6	3.8	.4	16.8
Black oak	18.3	5.5	2.4	.3	23.9	26.8
Northern red and Shumard oaks	6.9	.5	2.9	.4	10.3	4.9
Water oaks 2/	2.0	...	...	19.3	.4	...
Other red oaks	3.3	.7	....	5.3	4.1	2.7
White oaks, except post oak	13.3	6.3	2.9	8.7	15.5	18.5
Post oak	10.0	2.7	22.5	1.4	13.6	8.3
Sweetgum	5.0	.6	1.0	19.3	4.7	2.5
Blackgum	4.4	2.7	...	1.6	5.3	5.4
Hickory	10.9	4.2	14.1	3.9	13.9	11.3
Other hardwood	8.7	.6	16.6	36.0	7.9	2.8
Total hardwood	82.8	23.8	62.4	96.2	99.6	83.2
All species	100.0	100.0	100.0	100.0	100.0	100.0

1/ Principally redcedar and some cypress.
2/ Nuttall, water, and willow oaks.

Table 10.--Total volume by class of timber and species, 1948

Species	All timber	Growing stock			Tops and limbs	Cull trees
		All trees 1/	Sawlog trees	Cordwood trees		
	- - - - Million cubic feet - - - -					
Shortleaf pine	281.1	267.2	118.4	113.3	...	13.9
Other softwood 2/	29.1	19.3	6.1	11.4	...	9.8
Total softwood	310.2	286.5	124.5	124.7	...	23.7
Black oak	595.9	304.6	173.0	131.6	119.8	171.5
Northern red and Shumard oaks	237.4	114.8	69.8	45.0	44.8	77.8
Water oaks 3/	64.3	34.1	26.8	7.3	16.5	13.7
Other red oaks	97.9	55.8	31.4	24.4	19.3	22.8
White oaks, except post oak	451.7	222.0	110.7	111.3	71.1	158.6
Post oak	443.3	166.6	80.0	86.6	59.3	217.4
Sweetgum	132.7	83.5	53.4	30.1	26.8	22.4
Blackgum	170.3	73.5	57.5	16.0	32.7	64.1
Hickory	334.6	181.2	66.4	114.8	38.3	115.1
Other hardwood	498.5	144.2	77.5	66.7	50.2	304.1
Total hardwood	3,026.6	1,380.3	746.5	633.8	478.8	1,167.5
All species	3,336.8	1,666.8	871.0	758.5	478.8	1,191.2

1/ Includes tops of softwoods.
2/ Principally redcedar and some cypress.
3/ Nuttall, water, and willow oaks.

Table 11.--Total growing stock by species and stand-size class, 1948

Species	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Restocking and denuded
	- - - - Million cubic feet - - - -					
Shortleaf pine	267.2	19.1	102.3	138.4	6.0	1.4
Other softwood 1/	19.3	.6	4.5	10.5	3.4	.3
Total softwood	286.5	19.7	106.8	148.9	9.4	1.7
Black oak	304.6	39.6	77.2	163.2	20.3	4.3
Northern red and Shumard oaks	114.8	15.3	31.3	57.6	8.8	1.8
Water oaks 2/	34.1	14.7	10.7	7.7	.8	.2
Other red oaks	55.8	6.8	12.9	31.1	4.0	1.0
White oaks, except post oak	222.0	27.6	51.7	122.0	17.9	2.8
Post oak	166.6	6.5	20.3	114.2	20.2	5.4
Sweetgum	83.5	19.5	31.7	26.3	5.1	.9
Blackgum	73.5	20.8	19.5	27.0	5.6	.6
Hickory	181.2	14.8	33.2	110.9	17.7	4.6
Other hardwood	144.2	28.2	32.8	64.5	11.9	6.8
Total hardwood	1,380.3	193.8	321.3	724.5	112.3	28.4
All species	1,666.8	213.5	428.1	873.4	121.7	30.1

1/ Principally redcedar and some cypress.
2/ Nuttall, water, and willow oaks.

Table 12.--Average volume per acre of total growing stock by stand-size class and forest type, 1948

Forest type	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Restocking and denuded
	- - - - -			Cubic feet		- - - - -
Softwood types:						
Shortleaf pine	425	752	813	344	101	48
Cedar	82	...	...	179	61	23
All softwood types	338	752	813	324	73	31
Hardwood types:						
Bottomland hardwood	477	804	630	383	130	206
Upland hardwood	245	608	548	258	86	61
Upland hardwood-pine	247	578	544	252	100	32
All hardwood types	260	641	559	264	89	66
All types	273	652	613	274	87	60

Table 13.--Sawlog and total growing stock by species group and county, 1948

County	Total growing stock			Sawlog growing stock		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			Million board feet		
Baxter	63.8	7.9	55.9	220.2	31.4	188.8
Benton	56.3	1.7	54.6	199.8	4.9	194.9
Boone	56.5	1.2	55.3	182.6	2.1	180.5
Carroll	49.9	8.2	41.7	161.8	22.8	139.0
Cleburne	77.8	36.4	41.4	217.5	81.0	136.5
Conway	31.5	7.0	24.5	82.7	12.8	69.9
Crawford	43.5	1.9	41.6	158.1	6.6	151.5
Faulkner	62.3	10.8	51.5	234.4	34.4	200.0
Franklin	59.4	12.3	47.1	252.3	58.0	194.3
Fulton	37.5	1.4	36.1	125.5	1.5	124.0
Independence	84.4	8.6	75.8	241.0	12.3	228.7
Izard	46.4	7.7	38.7	129.4	14.4	115.0
Johnson	89.3	34.5	54.8	265.4	93.3	172.1
Madison	79.3	4.3	75.0	250.4	7.3	243.1
Marion	28.7	4.1	24.6	104.1	12.1	92.0
Newton	105.6	7.5	98.1	374.2	15.6	358.6
Pope	101.8	30.8	71.0	330.2	84.0	246.2
Randolph	56.0	1.1	54.9	162.6	1.8	160.8
Searcy	88.6	9.8	78.8	277.8	21.6	256.2
Sharp	49.0	3.1	45.9	160.0	8.7	151.3
Stone	97.8	26.3	71.5	322.7	63.2	259.5
Van Buren	120.3	52.1	68.2	368.3	138.1	230.2
Washington	56.8	.2	56.6	183.8	...	183.8
White	124.3	7.6	116.7	429.2	16.3	412.9
All counties	1,666.8	286.5	1,380.3	5,434.0	744.2	4,689.8

Table 14.--Sawlog volume by species and tree diameter class, 1948

Species	All diameter classes	10 inches	12 inches	14 and 16 inches	18 and 20 inches	22 and 24 inches	26 inches and above
				Million board feet			
Shortleaf pine	710.1	235.1	177.0	257.4	34.5	6.1	...
Other softwood 1/	34.1	10.5	14.5	6.6	2.5	...	...
Total softwood	744.2	245.6	191.5	264.0	37.0	6.1	...
Black oak	1,105.0	...	240.5	418.8	271.2	125.1	49.4
Northern red and Shumard oaks	449.3	...	90.8	166.0	97.6	50.8	44.1
Water oaks 2/	170.6	...	20.8	64.5	53.5	20.6	11.2
Other red oaks	197.0	...	57.1	89.0	29.8	16.1	5.0
White oaks, except post oak	705.9	...	184.7	279.4	135.4	72.6	33.8
Post oak	482.1	...	123.3	225.8	107.8	20.3	4.9
Sweetgum	333.7	...	65.9	134.1	85.2	39.2	9.3
Blackgum	366.3	...	45.7	137.9	126.0	29.9	26.8
Hickory	399.3	...	126.3	194.7	56.0	17.7	4.6
Other hardwood	480.6	...	120.9	184.4	100.6	51.3	23.4
Total hardwood	4,689.8	...	1,076.0	1,894.6	1,063.1	443.6	212.5
All species	5,434.0	245.6	1,267.5	2,158.6	1,100.1	449.7	212.5

1/ Cypress and redcedar in roughly equal amounts.
2/ Nuttall, water, and willow oaks.

Table 15.--Sawlog volume by species and stand-size class, 1948

Species	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Restocking and denuded
	- - - -		Million board feet		- -	- -
Shortleaf pine	710.1	89.6	384.2	217.9	15.8	2.6
Other softwood 1/	34.1	2.6	12.8	12.9	5.3	.5
Total softwood	744.2	92.2	397.0	230.8	21.1	3.1
Black oak	1,105.0	214.4	364.2	446.6	62.5	17.3
Northern red and Shumard oaks	449.3	89.1	154.7	171.7	26.2	7.6
Water oaks 2/	170.6	82.7	61.9	21.8	3.7	.5
Other red oaks	197.0	35.7	60.8	84.9	10.0	5.6
White oaks, except post oak	705.9	144.5	189.2	301.1	60.3	10.8
Post oak	482.1	26.9	84.7	289.5	66.7	14.3
Sweetgum	333.7	111.5	120.4	77.8	19.6	4.4
Blackgum	366.3	123.5	104.0	115.4	21.3	2.1
Hickory	399.3	56.3	99.6	193.0	35.7	14.7
Other hardwood	480.6	148.8	140.3	145.0	28.5	18.0
Total hardwood	4,689.8	1,033.4	1,379.8	1,846.8	334.5	95.3
All species	5,434.0	1,125.6	1,776.8	2,077.6	355.6	98.4

1/ Cypress and redcedar in roughly equal amounts.
2/ Nuttall, water, and willow oaks.

Table 16.--Sawlog volume by softwood tree grade, hardwood log grade, and stand-quality class, 1948

Species group	All grades	Grade 1	Grade 2	Grade 3	
				In fair and better stands	In poor stands
	- - - - Million board feet - - - - -				
Softwood	744.2	74.4	290.2	125.3	254.3
Hardwood	4,689.8	375.2	750.4	1,069.3	2,494.9
All species	5,434.0	449.6	1,040.6	1,194.6	2,749.2

Table 17.--Average sawlog volume per acre by stand-size class and forest type, 1948

Forest type	All stand sizes	Large saw timber	Small saw timber	Cordwood	Seedling and sapling	Restocking and denuded
	- - - - Board feet - - - - -					
Softwood types:						
Shortleaf pine	1,145	3,183	3,057	585	292	67
Cedar	208	...	...	500	131	62
All softwood types	909	3,183	3,057	575	179	64
Hardwood types:						
Bottomland hardwood	1,967	4,422	2,780	1,047	572	555
Upland hardwood	817	3,308	2,343	646	260	217
Upland hardwood-pine	784	2,859	2,353	654	240	111
All hardwood types	885	3,461	2,405	667	266	224
All types	889	3,435	2,544	651	255	195

Table 18.--Current annual net growth of sawlog and total growing stock, by species group and class of timber, 1948

Class of timber	Total growing stock			Sawlog growing stock		
	All species	Softwood	Hardwood	All species	Softwood	Hardwood
	Million cubic feet			Million board feet		
Sawlog trees	33.7	12.6	21.1	302.5	74.9	227.6
Cordwood trees	50.0	5.7	44.3	...	...	...
All trees	83.7	18.3	65.4	302.5	74.9	227.6

Table 19.--Average current annual net growth per acre of sawlog and total growing stock, by forest-type group and stand-size group, 1948

Stand-size group	Total growing stock			Sawlog growing stock		
	All types	Softwood types	Hardwood types	All types	Softwood types	Hardwood types
	Cubic feet			Board feet		
Saw timber	19	30	17	117	148	111
Cordwood	15	25	13	50	75	45
Other stand sizes	9	8	9	12	26	10
All stand sizes	14	21	12	49	75	45

Definition of Terms

Forest Land

Forest land. Land which bears forest growth, or land from which the forest has been removed and which has not been put to other use. Each tract classed as forest is at least one acre in size.

Commercial forest land. Land bearing, or capable of bearing, timber of commercial quantity and quality, and not withdrawn from commercial timber use.

Noncommercial forest land. Includes (1) land in public parks or preserves withdrawn from commercial timber use, and (2) land which appears to be permanently incapable of commercial timber production because of low productivity.

Tree Species

Softwoods. Pine, eastern redcedar, and cypress.

Hardwoods. Any broadleaved species.

Forest Type

Forest type is determined only from dominant and codominant growing-stock and smaller sound trees.

Shortleaf pine. Stands in which pine comprises at least 25 percent of the trees.

Cedar. Stands in which eastern redcedar comprises at least 25 percent of the trees.

Bottomland hardwood. Stands in which bottomland hardwoods and cypress comprise 76 percent or more of the trees.

Upland hardwood. Stands containing no pine, in which upland hardwoods comprise 76 percent or more of the trees.

Upland hardwood-pine. Stands classifiable as upland hardwood but containing some pine.

Class of Timber

Growing stock. Sawlog growing stock is the sawlog portions of sawlog trees. Total growing stock includes sawlog growing stock, and upper stems of softwood sawlog trees and entire stems of cordwood trees to a minimum diameter of 4 inches inside bark.

Sawlog tree. A live, merchantable softwood 9.0 inches or larger in d.b.h., or a live, merchantable hardwood 11.0 inches or larger in d.b.h. To be merchantable, the tree must have at least a merchantable 12-foot butt log or 50 percent of its gross volume in merchantable logs.

Cordwood tree. A live tree 5.0 inches or larger in d.b.h., but smaller than sawlog size, which would become a sawlog tree if it should grow to sawlog size.

Cull tree. A live tree 5.0 inches or larger in d.b.h., which because of decay or sound defect fails to meet the specifications for a cordwood or sawlog tree.

Tops and limbs. Upper stems and limbs of hardwood sawlog trees between the top sawlog and a minimum diameter of 4 inches inside bark.

Stand-Size Class

Large saw timber. Stands having a net volume of at least 1,500 board feet per acre in sawlog trees and at least half of this volume in softwoods 15.0 inches d.b.h. and larger, and hardwoods 17.0 inches d.b.h. and larger.

Small saw timber. Stands which do not meet the specifications for large saw timber but which do contain a net volume of at least 1,500 board feet per acre in sawlog trees.

Cordwood. Stands below saw-timber specifications, with at least 10 percent of the growing space occupied by growing stock, and with at least 5 percent of the growing space occupied by cordwood trees.

Seedling and sapling. Stands below saw-timber and cordwood specifications, in which at least 40 percent of the growing space is occupied by growing stock and smaller sound trees of commercial species, but with less than 10 percent of the space occupied by growing stock.

Restocking and denuded. Commercial forest land which does not qualify for any other stand-size class.

Tree Stocking

Degree of stocking is determined by the ratio of the actual number of trees in the stand to the number of trees of the same size required to occupy the site fully. Under this criterion, stands are well stocked when the percentage of full stocking is 70 or above, partially stocked when the percentage is 40 to 69, poorly stocked when the percentage is 10 to 39, and nonstocked when the percentage is under 10.

Volume and Basal Area

Sawlog volume. Net volume in merchantable sawlogs in sawlog trees, measured by the International 1/4-inch log rule.

Total volume. Volume of sound, usable wood in stems of softwoods and stems and branches of hardwoods between stump and minimum top diameter of 4 inches inside bark, measured in cubic feet.

Basal area. Cross-sectional area of trees at breast height, measured in square feet.

Diameter

D.b.h. (diameter breast high). Tree diameter in inches, outside bark, measured at $4\frac{1}{2}$ feet above ground.

Diameter class. Each 2-inch diameter class includes diameters 1.0 inch below and 0.9 inch above the stated midpoint. E.g., the 12-inch class includes trees 11.0 up to and including 12.9 inches.

Growth

Current annual net growth. A forecast of the average annual increase in the reported growing stock over a decade if no cutting should take place, allowing for normal tree mortality due to suppression, fire, windthrow, and other causes.

Log and Tree Grade

Tree grades for softwoods:

Grade 1 (smooth trees). Not less than 20 feet of clear bole and at least 40 percent of the merchantable length clear of limbs and knots in sections not less than 8 feet in length.

Grade 2 (limby trees). Not less than 12 feet of clear bole and 25 to 39 percent of the merchantable length clear of limbs and knots in sections not less than 8 feet in length.

Grade 3 (rough trees). Merchantable trees below grade 2 specifications.

Log grades for hardwoods: 1/

Grade 1. Smooth, generally clear logs which yield at least one-half of their volume in higher grades of lumber.

Grade 2. Logs of average clearness and medium size which yield from one-third to one-half of their volume in higher grades of lumber.

Grade 3. Small logs or logs of less than average clearness which yield less than one-third of their volume in higher grades of lumber, or sound logs with coarse defects which make them suitable only for ties and timbers.

Stand Quality

Fair and better. A stand in which grade 2 or better hardwood logs or softwood trees are present.

Poor. A stand in which no grade 2 hardwood logs or softwood trees are present.

1/ For external specifications of log grades used, see "Interim Sawlog Grades for Southern Hardwoods," Southern Forest Experiment Station, 9 pp., January 1948.